

BASIS FOR THE AMENDMENT

Claims 1-6 and 8-21 are active in the present application. Claims 1 and 4-5 have been amended for clarity. Claim 7 has been cancelled. Claims 8-13 are non-elected claims. Claims 14-21 are new claims. Support for new Claim 14 is found on page 4, line 9. Support for new Claim 15 is found on page 5 between lines 9 and 10. Support for new Claim 16 is found on page 6, lines 26-27. Support for new Claim 17 is found on page 7, line 5. Support for new Claim 18 is found on page 7, lines 6-8. Support for new Claim 19 is found on page 8, lines 1-2. Support for new Claim 20 is found on page 8, line 10. Support for new Claim 21 is found on page 8, lines 24-26. No new matter is added.

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Keys for the helpful and courteous discussion of August 28, 2003. During the discussion, Applicants' U.S. representative presented arguments that the perfluoroalkylolefin species of one of the prior art references cited by the Examiner (Knaup) are not the perfluorooloefins recited in present Claim 1.

Applicants have claimed a process in which an alkanol is reacted with a perfluoroolefin in the presence of a radical initiator. The reaction is carried out by continuously adding a radical initiator and the perfluoroolefin to a reaction mixture comprising the alkanol. By carrying out the reaction in this manner, Applicants are able to significantly improve the conversion rate of methanol to fluoroalkanol and the selectivity of the fluoroalkanol-producing reaction (page 3, lines 11-12).

Applicants have provided Examples and Comparative Examples in the specification to compare the reaction performance of the claimed process with prior art processes. In Example 2 on pages 11 and 12; 2,2,3,3-tetrafluoropropanol is prepared by reacting methanol with tetrafluoroethylene in the presence of di-t-butyl peroxide. In Example 2, the reaction is started by charging 408g of methanol into an autoclave and then charging tetrafluoroethylene into the gas phase portion of the autoclave. The temperature is adjusted to 125°C and then a solution of the radical initiator (di-t-butyl peroxide) dissolved in 72g of methanol is added by way of a metering pump. The radical initiator is first supplied for 0.5 hours at a rate of 40 g/hr and then is supplied for 15 hours at a rate of 4 g/hr. Example 2 provides the intended product (2,2,3,3-tetrafluoropropanol) at a selectivity of 96% and at a conversion rate based upon methanol of 22%.

In Comparative Example 1 on page 12; 2,2,3,3,-tetrafluoropropanol is prepared using a prior art process, namely, a process in which all of the reactants are charged to an autoclave at one time and then the reaction is carried out. Therefore, 800 g of methanol, 14.6 g of di-t-

butyl peroxide and 1.12 g of calcium oxide are charged all at once into an autoclave.

Tetrafluoroethylene is then charged over a period of 20 hours in the gas phase. The 2,2,3,3-tetrafluoropropanol product was formed at a selectivity of 95% and a conversion rate of methanol of 6.8%. The results for Example 2 and Comparative Example 1 are tabulated below for convenience.

Table 1

	Radical Initiator	Total Methanol (g)	Temperature (°)	Total Reaction Time (hr)	Continuous Addition of Initiator	Amount of TFE	Conversion Rate (%)	Selectivity (%)
Example 2	8.2	480	125	15.5	Y	230	22	96
Comparative Example 1	14.6	800	125	20	N	180	6.8	95

As can be seen by comparing Example 2 and Comparative Example 1, the invention process which uses a lower amount of radical initiator, a lower amount of methanol and a lower total reaction time is still able to provide a higher conversion rate of methanol (22% vs. 6.8%). Comparative Example 1 has a greater amount of methanol and a greater amount of the radical initiator is present, however, the comparative process is unable to provide the conversion rate achieved by the claimed process.

Applicants have therefore demonstrated that the claimed process provides significantly superior results in comparison to processes not meeting the claim limitations as evidenced at least by a significantly greater conversion rate for methanol. Applicants submit that this evidence is sufficient to demonstrate the unobviousness of the claimed invention in view of processes wherein the alkanol and a perfluoroolefin are combined in a total amount at the beginning of a reaction without continuous addition of the initiator.

The Office rejected Claims 1-6 under 35 U.S.C. § 103(a) in view of a combination of patents to Joyce (U.S. 2,559,628) and Knaup (U.S. 5,227,540). Applicants traverse the

rejection on the grounds that the Joyce patent does not disclose a process wherein the initiator is added continuously to a reaction mixture of a perfluoroolefin and an alkanol, and further in view of the fact that the Knaup patent is drawn to processes for reacting olefins that are substantially different from the perfluoroolefins of the presently claimed invention.

Joyce discloses that the prior art process is preferably carried out in a closed system (col. 3, lines 1-2). Applicants submit that those of ordinary skill in the art readily recognize that a closed system is a system in which no additional components are added to a reaction vessel after all of the components have been combined at once in the vessel. Nowhere in Joyce is it disclosed that the radical initiator must be added continuously to the reaction mixture (e.g., alkanol). In fact, in all of the Examples of Joyce it is disclosed that the prior art autoclave is closed after the methanol, radical initiator and tetrafluoroethylene are added (col. 3, lines 63-64; col. 4, line 64; col. 5, lines 14-15; col. 6, lines 11-12; col. 6, lines 42-43; and col. 7, lines 3-5). Although Joyce discloses that the prior art process may be carried out continuously (column 9, lines 5-16), Joyce does not disclose that continuous reaction includes continuous addition of one or more of the reaction components to the alkanol.

The Office has combined the teachings of Knaup with Joyce as grounds in support of the assertion that the presently claimed invention is obvious. Knaup, however, does not disclose or suggest that perfluoroolefins of formula 3 of present Claim 1 are suitable for the Joyce process nor do the fluoroalkanols produced by the prior art process meet the present claim limitations. Applicants submit that the Knaup reference is not pertinent prior art to the claimed invention as evidenced by the fact that Knaup's disclosure is directed to olefins that are different from the olefins recited in present Claim 1. The rejections in view of the Knaup patent should therefore be withdrawn.

The Office appears to be taking official notice that the perfluoroalkylolefin materials of Knaup are analogous to the presently claimed perfluoroolefin materials. Applicants

traverse any such assertion. The perfluoroalkylolefin (actually perfluoroalkylethylene) of Knaup is of formula $R_fCH=CH_2$ whereas the perfluoroolefin recited in present Claim 1 is of formula $CF_2=CFR^3$ (R^3 is a fluorine atom or a C_{1-4} perfluoroalkyl group). There is an important difference between the perfluoroalkylethylene of Knaup and the perfluoroolefin of the present invention. The perfluoroalkylethylene of Knaup is not in fact a perfluoroolefin since the olefinic moiety of the prior art chemical species is not fluorinated (e.g., the olefinic portion of the prior art species has either C-H or C-R bonds but no C-F bonds). In contrast, formula 3 of present Claim 1 requires that the olefinic portion of the perfluoroolefin contain only C-F or C-C bonds (see formula 3 of present Claim 1).

Applicants submit that those of ordinary skill in the art readily recognize that the physical and chemical properties of hydrocarbon olefins (e.g., those olefins having only C-C and C-H bonds such as ethylene) are substantially different in comparison to perfluoroolefins (e.g., those olefins having one or more C-F bonds such as tetrafluoroethylene). Moreover Applicants submit that those of ordinary skill in the art readily recognize that the properties of any polymeric species obtained therefrom are substantially different (compare for example polyethylene and polytetrafluoroethylene). Therefore, the unsaturated species of Knaup, wherein the olefin is not a perfluoroolefin but is rather a perfluoroalkylethylene, are not analogous to the presently claimed perfluoroolefin within the meaning of obviousness under 35 U.S.C. §103.

How can one have a reasonable expectation that a genus of compounds such as the perfluoroolefins of the present invention will successfully provide a polymer product when treated in a process that has not been demonstrated to be carried out on the claimed genus?

It appears that the Office is asserting that compounds having a $H_2C=$ moiety are obvious over compounds having a $F_2C=$ moiety (where “=” indicates a carbon-carbon double bond). Such logic appears to ignore the fact these two moieties are composed of different

elements (i.e., C-F vs. C-H bonds). Is tetrafluoroethylene (encompassed by the presently claimed process) obvious over ethylene? If the Office is asserting (e.g., taking Official Notice) that perfluoroolefins and perfluoroalkylolefins are analogous and are expected have the same physical and/or chemical properties, Applicants challenge the Office's assertion and respectfully request the Office provide evidence in support of any such Official Notice.

Applicants submit the presently claimed process is not obvious in view of the Joyce and Knaup processes on the grounds that (1) Joyce discloses that an "all-at-once" addition of alkanol, perfluoroolefin and radical initiator is preferred and further in view of the fact that (2) the teachings of Knaup are directed to perfluoroalkylolefinic species and not the perfluoroolefins of the present invention and is therefore not pertinent prior art.

Applicants respectfully request the withdrawal of the rejections and the passage of all now-pending claims to Issue.

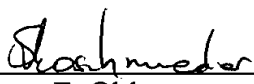
Respectfully submitted,

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